

Nevada Division of Minerals Hydraulic Fracture Chemical Disclosure Reference List
(in CASRN™ numerical order)

Row #	Chemical Name (* indicates Trade Name or ingredient is Trade Secret)	Chemical Abstracts Service Registry Number (CASRN™) (1)	Product Function	Chemical Purpose	Other Uses (2)	Existing Chemical on EPA TSCA list (3)	EPA's Pesticide InertFinder Listing If Approved for Food, NonFood, Fragrance Use (4)	Carcinogenic Agent Classified (Group 1 or 2) by the IARC Monographs - (V. 1-109) (5)	CA Prop.65 Listed Agent (6)	NIOSH REL (TWA ppm) (7)	OSHA PEL (TWA ppm) (7)	API Well Usage Count West of Long. 104 (8)	Avg. Conc. In HF Fluid (% by mass) (8)
1	Formaldehyde	000050-00-0	Corrosion inhibitor, friction reducer, and biocide	Elimination of bacteria in well, prevention of corrosion	Antiseptic, disinfectant, histologic fixative, and general-purpose chemical reagent for laboratory applications. Formaldehyde is used mostly to make resins used in building materials, coatings for paper and clothing fabrics, and synthetic fibers. A second major use is as a starting chemical to make other chemicals.	Yes	NL	Yes, Group 1 (Carcinogenic)	Yes (as a gas) No Significant Risk Level (NSRL) = 40 µg/day	0.016 ppm	0.75 ppm	13,546	0.00688
2	2-Bromo-2-nitro-1,3-propanediol	000052-51-7	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Preservative in cosmetics and toiletries	Yes	F, NF	No	No	NL	NL	514	0.00172
3	Glycerine	000056-81-5	Crosslinker		Cosmetics, hand lotions, pharmaceuticals	Yes	F, NF	No	No	NA	NA	2,312	0.03336
4	Propylene glycol	000057-55-6	Scale Inhibitor	Scale Inhibitor	Paints, detergents, air fresheners, numerous skin, face and hair care products; special effects fog	Yes	F, NF, Fr	No	No	NL	NL	1,960	0.00992
5	Lactose	000063-42-3	Stabilizer	Product stabilizer	Used in baby formula, skin cleansers, anti-wrinkle creams; anti-fungal aquarium treatments	Yes	F, NF	No	No	NL	NL	17	0.00764
6	Ethanol	000064-17-5	Surfactant	Product stabilizer and / or winterizing agent.	Alcoholic beverages, pharmaceuticals, perfumes, solvents, dehydration, rubbing alcohol	Yes	F, NF, Fr	No	No	1000	1000	6,205	0.02972
7	Formic Acid	000064-18-6	Corrosion Inhibitor	Prevents the corrosion of the pipe	Manufacture of fumigants	Yes	NF	No	No	5	5	1,952	0.00434
8	Acetic Acid	000064-19-7	pH Adjusting Agent	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers, prevents precipitation of metal oxides	Vinegar (4-8%); food additive (<8%); (>10% used as industrial chemical for controlling pH)	Yes	F, NF, Fr	No	No	10	10	6,624	0.01037
9	Choline Chloride	000067-48-1	Clay Stabilizer	Prevents clays from swelling or shifting	Pharmaceuticals; additive to chicken feed	Yes	F, NF	No	No	NL	NL	3,285	0.07977
10	Methanol	000067-56-1	Corrosion Inhibitor, Friction Reducer, Crosslinker	Prevents the corrosion of the pipe	Solvent, antifreeze, fuel; windshield wiper fluid; used as extractant for animal and vegetable oils	Yes	F, NF, Fr	No	Yes, 47,000 ug/day (inhal.), 23,000 ug/day (oral)	200	200	25,049	0.12366
11	Isopropanol	000067-63-0	Corrosion Inhibitor, Surfactant	Product stabilizer and / or winterizing agent	Solvent, rubbing alcohol, pharmaceuticals, biocide	Yes	F, NF, Fr	No	No	400	400	13,575	0.01530
12	Thioglycolic Acid	000068-11-1	Iron Control	Prevents precipitation of metal oxides	Hair removal products, hair "perm" products; often used in certain PVC products	Yes	NF	No	No	1	NA	159	0.00181
13	N,N-Dimethyl formamide	000068-12-2	Solvent	Solvent	Solvent, used in production of acrylic fibers and plastics and manufacture of adhesives, films and coatings	Yes	NL	No	No	10	10	1,775	0.00246
14	Propanol	000071-23-8	Crosslinker		Used in manufacture of cosmetics, skin and hair products, pharmaceuticals, perfumes, soap, window cleaners	Yes	F, NF	No	No	200	200	448	0.01593
15	Butyl alcohol	000071-36-3			Used in aerosol paints, permanent and dry erase markers, aftershave	Yes	F, NF, Fr	No	No	NA	100	344	0.00854
16	Cobalt acetate	000071-48-7		Catalyst for oxidation	Chimney flue cleaner, pigment, ion exchange, plating agent, oil drying agent	Yes	NL	No	No	NL	NL	109	0.00087
17	Acetaldehyde	000075-07-0	Corrosion Inhibitor	Prevents the corrosion of the pipe	Used in manufacture of plastics, resins, cosmetics, pharmaceuticals, perfumes, glue, paper; as a food preservative; occurs naturally in some foods (ripe fruits and coffee)	Yes	Fr	Yes, Group 2B (possibly carcinogenic)	Yes, (90 ug/day-inhalation)	Ca/LOQ 18	200	404	0.00016
18	Tetramethyl ammonium chloride	000075-57-0	Clay Stabilizer	Prevents clays from swelling or shifting	Industrial and medical research applications as a hydroscopic solid	Yes	NL	No	No	NL	NL	930	0.07396
19	Citric Acid	000077-92-9	Iron Control	Prevents precipitation of metal oxides	Beverages, pH aduster in food, used in making of cheese, jellies, and candies; special inks, foam inhibitor	Yes	F, NF, Fr	No	No	NL	NL	5,292	0.00842
20	Acrylamide (allowed only as residual acrylamide monomer <0.05% in polyacrylamide and <0.000001% in HF fluid)	000079-06-1	Flocculant, lubricant, corrosion inhibitor	Decreases friction of surfaces/aids in transporting sand grains into cracks, may help drop out of solids/proppant and limit corrosion of pipe	Used for sewage and waste treatment (limit is 0.5µg/l), also to make dyes, cosmetics, adhesives. Common in baked and fried snacks (chips, crackers, fries - 500-2,000 ppb). Readily biodegradeable in the environment	Yes	NL	Yes, Group 2A (Probably Carcinogenic)	Yes, No Significant Risk Level (NSRL) = 0.2 µg/day	0.03 mg/m ³ (skin)	0.3 mg/m ³ (skin)	15,136	0.00019
21	Naphthalene	000091-20-3	Surfactant	Carrier fluid for the active surfactant ingredients	Intermediate chemical used in the manufacture of plastics, soaps, dyes, sheetrock, pesticides, paper, pharmaceuticals	Yes	NF, Fr	Yes, Group 2B (possibly carcinogenic)	Yes, No Significant Risk Level (NSRL) = 5.8 µg/day	10	10	3,983	0.00461
22	1,2,4 Trimethylbenzene	000095-63-6	Surfactant		Used as sterilizing agent; manufacture of dyes, perfumes, resins; occurs naturally in coal tar and petroleum	Yes	NF, Fr	No	No	NL	NL	2,548	0.00109
23	Acetophenone	000098-86-2	Corrosion Inhibitor, anti-scaling	Anti-Scaling/Corrosion Inhibitor Ingredient for pipe integrity	Fragrance in soaps and perfumes, as a flavoring agent in foods, and as a solvent for plastics and resins	Yes	F, NF, Fr	No	No	NA	10 (CAL/OSHA)	2,841	0.00005
24	Hexamethylenetetramine	000100-97-0	Proppant	Acts to harden resin-based proppants	Used in manufacture of resins, adhesives; camping fuel tablets, antimicrobial food additive; pharmaceuticals	Yes	F, NF	No	No	NL	NL	2,651	0.05413
25	Triethanolamine	000102-71-6	Surfactant	Adjusts and buffers pH, solubilizes oils	Used in wide variety of detergents and cleaners; shaving creams, cosmetics, hand lotions	Yes	F, NF, Fr	No	No	NA	NA	1,164	0.03717

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26	Cinnamaldehyde (Cinnamic aldehyde)	000104-55-2	Corrosion inhibitor	Controls acid corrosion in the pipe	hypoglycemic agent, an EC 4.3.1.24 (phenylalanine ammonia-lyase) inhibitor, a vasodilator agent, an antifungal agent, a flavouring agent, a plant metabolite and a sensitiser	Yes	NF, Fr	No	No	NL	NL	16,723	0.00114
27	2-Ethylhexanol	000104-76-7			Fatty alcohol used as a low volatility biodegradable solvent; also in the production of emollients	Yes	F, NF, Fr	No	No	NL	NL	1,398	0.00239
28	Propargyl Alcohol	000107-19-7	Corrosion Inhibitor			Yes	NF	No	No	1	NA	6,330	0.00040
29	Ethylene Glycol	000107-21-1	Crosslinker, Friction Reducer, Gelling Agent	Product stabilizer and / or winterizing agent.	Used in manufacture of textiles, resins, and plastics (PET); antifreeze; preservative for biological specimens and woods	Yes	F, NF, Fr	No	No	NA	NA	12,513	0.05389
30	Acetic anhydride	000108-24-7	pH Adjusting Agent			Yes	F, NF	No	No	5	5	1,435	0.02060
31	Propylene carbonate	000108-32-7			Used in anti-perspirant, mascara, lipstick	Yes	F, NF	No	No	NL	NL	779	0.00102
32	Glutaraldehyde	000111-30-8	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Disinfectant for medical and dental equipment; industrial water treatment; pharmaceuticals	Yes	NF	No	No	REL C 0.2	NA	5,824	0.18426
33	Diethylenetriamine	000111-40-0	Activator	Assists in extraction of acid gas	Used in epoxies and adhesives	Yes	NF	No	No	1	NA	431	0.00328
34	2-Butoxyethanol	000111-76-2	Surfactant	Product stabilizer	Latex and enamel paints, silicone caulk; used in a wide variety of industrial and household cleaners; food additive; antimicrobial	Yes	F, NF, Fr	Yes (Group 3 - unknown)	No	5	50	32,902	0.01238
35	n-Octanol	000111-87-5	Surfactant		Used in toilet bowl cleaner, used in manufacture of perfume	Yes	F, NF, Fr	No	No	NL	NL	849	0.00059
36	n-Decanol	000112-30-1	Surfactant	Product stabilizer	Used in kitchen and bathroom disinfectants and cleaners	Yes	F, NF, Fr	No	No	NL	NL	863	0.00077
37	Sodium diacetate	000126-96-5	Scale Inhibitor	Controls pH and inhibits bacteria	Used as a pickling agent and as an antimicrobial	Yes	NF	No	No	NL	NL	1,982	0.00295
38	Sodium bicarbonate	000144-55-8	Buffer	Controls the pH	Baking soda; used in variety of effervescent and food products; cleaning compounds	Yes	F, NF	No	No	NL	NL	707	0.01006
39	Sodium Carbonate	000497-19-8	pH Adjusting Agent	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	Baking powder; soda ash, used as a pH adjuster; fungicide; food additive; water softener; used in the manufacture of glass	Yes	F, NF	No	No	NL	NL	525	0.01112
40	Potassium Carbonate	000584-08-7	pH Adjusting Agent	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	Used as a pH adjuster; food additive; water softener; used in production of beer, wine, glass and ceramics	Yes	F, NF	No	No	NL	NL	2,161	0.05904
41	Potassium formate	000590-29-4	Crosslinker		Used as a road de-icing agent	Yes	NL	No	No	NL	NL	886	0.05515
42	1-Hexadecene	000629-73-2	Surfactant			Yes	NL	No	No	NL	NL	1,787	0.00007
43	Ammonium acetate	000631-61-8	Buffer	Controls the pH	Used as buffering agent, food additive, biodegradable de-icing agent; used in manufacture of explosives, foam rubber, vinyl plastics; sometimes used in dialysis	Yes	NF	No	No	NL	NL	2,374	0.02837
44	2,7-Naphthalenedisulfonic acid, 3-hydroxy-4-[[4-sulfur-1-naphthalenyloazo]-], trisodium salt	000915-67-3	Colorant	Coloring agent	Used as non-food colorant or dye (amaranth)	Yes	NF	Yes (Group 3 - unknown)	No	NL	NL	2,024	0.00008
45	2-Bromo-2-cyanoacetamide	001113-55-9	Biocide	Prevents or limits growth of bacteria	Used as anti-microbial in water treatment and fumigant	No	NF	No	No	NL	NL	347	0.00006
46	Sodium Tetraborate	001303-96-4	Crosslinker	Maintains fluid viscosity as temperature increases	Borax; used in detergents, cosmetics, fire retardants, food additives, pharmaceuticals	Yes	F, NF	No	No	NA	NA	1,721	0.02755
47	Magnesium Oxide	001309-48-4	Breaker	Allows a delayed breakdown of the gel	The mineral periclase; used as an antacid and mineral supplement; used in manufacture of cement, fire insulation, paper and rubber	Yes	F, NF	No	No	NA	NA	275	0.01210
48	Potassium Hydroxide	001310-58-3	pH Adjusting Agent	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	Used in the manufacture of biodiesel, soft soaps, alkaline and NiMH batteries; used in shaving creams and hair removing products	Yes	F, NF	No	No	NA	NA	6,970	0.01137
49	Sodium Hydroxide	001310-73-2	pH Adjusting Agent	Adjusts the pH of fluid to maintains the effectiveness of other components, such as crosslinkers	Lye; used in vegetable oil refining, chemical peeling of fruits and vegetables in the food industry; chocolate and cocoa processing; soaps, detergents; soft drinks; thickening of ice cream	Yes	F, NF	No	No	NA	NA	8,834	0.02005
50	Ulexite	001319-33-1	Water conditioner		Natural occurring borate mineral; decomposes in hot water; used in soaps and detergents as a water softener	No	NL	No	No	NL	NL	942	0.04016
51	Sorbitan, mono-9-octadecenoate, (Z)	001338-43-8	Surfactant		Emulsifier (Polysorbate 80) in a variety of food products (ice cream, protein shakes, salad dressings); pharmaceuticals	Yes	F, NF	No	No	NL	NL	4,922	0.00219
52	Sodium glycolate	002836-32-0	Iron control		Used similarly to acetic acid; in face and skin cleaners; some stain removers	Yes	NF	No	No	NL	NL	1,609	0.00051
53	Hydroxylamine hydrochloride	005470-11-1	Antioxidant	Used as a reducing agent	Used as a pigment fixative, flotation aid, additive in cleaners	Yes	NL	No	No	NL	NL	1,302	0.00048
54	Sodium Erythorbate	006381-77-7	Iron Control	Prevents precipitation of metal oxides	Food preservative used in meats, poultry and soft drinks; derived from beet, cane and corn sugars	Yes	NF	No	No	NL	NL	1,353	0.01033

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55	Pigment Red 48:2	007023-61-2	Coloring agent	Coloring agent	Pigment for coatings, inks, plastics, rubber, and cloth.	Yes	F, NF	No	No	NL	NL	NL	N/A
56	Didecyltrimethylammonium chloride	007173-51-5	Surfactant	Product stabilizer	Used in hair conditioners, and a wide variety of household cleaners and disinfectants	Yes	F, NF	No	No	NL	NL	16,429	0.01732
57	Potassium chloride	007447-40-7	Base Fluid		Used in lawn and plant fertilizers; hair and skin products; air fresheners; laundry detergents	Yes	F, NF	No	No	NL	NL	1,817	7.62637
58	Silica, amorphous - fumed	007631-86-9	Proppant	Acts to keep fractures propped open	Diatomaceous earth; used as filtering agent for liquids (pools, beer, wine, fruit juice)	Yes	F, NF	No	No			3,110	0.70596
59	Hydrochloric Acid	007647-01-0	Acid	Helps dissolve minerals and initiate cracks in the rock	Used as cleaner and disinfectant (bleach) and scale remover; used in manufacture of foods, food additives, gelatin and PVC	Yes	F, NF	No	No	NA	NA	13,716	1.71565
60	Sodium Chloride	007647-14-5	Breaker, Clay Stabilizer	Product Stabilizer, Prevents clays from swelling	Salt; used in foods, water softeners, highway deicing, herbicides, fire extinguishers, mouthwash	Yes	F, NF	No	No	NL	NL	12,610	0.24702
61	Potassium iodide	007681-11-0	Intensifier	Corrosion inhibitor	Antifungal, sanitizing solutions, medicinal uses	Yes	F, NF	No	No	NL	NL	2,706	0.00002
62	Sodium hypochlorite	007681-52-9	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Used in many kitchen and bathroom surface cleansers	Yes	NF	No	No	NL	NL	807	0.01294
63	Sodium iodide	007681-82-5			Used in iodized table salt to prevent iodine deficiency	Yes	F, NF	No	No	NL	NL	1,037	0.00005
64	Ammonium Phosphate	007722-76-1			Used in many lawn and plant fertilizers	Yes	NF	No	No	NL	NL	1,013	0.00005
65	Nitrogen	007727-37-9	Base fluid		Naturally occurring gas; most often used as a propellant in aerosols	Yes	NF	No	No	NL	NL	410	16.04810
66	Ammonium Persulfate	007727-54-0	Breaker	Allows a delayed break down of the gel	Oxidizer used in the manufacture of synthetic rubber and Teflon; often used in etching metals; also used in hair bleaches	Yes	NF	No	No	NA	NA	9,801	0.01636
67	Sodium sulfate	007757-82-6	Iron control		The minerals thenardite and mirabilite; used as a filler in home laundry detergents; used in manufacture of wood pulp, glass, and textiles; also used in thermal storage	Yes	F, NF	No	No	NL	NL	3,126	0.00193
68	Sodium sulfite	007757-83-7			Used in pulp and paper industry, textile industry, at water treatment facilities; used as food preservative	Yes	NF	No	No	NL	NL	325	0.00324
69	Sodium chlorite	007758-19-2	Breaker	Reduces fluid viscosity	Used to generate chlorine dioxide; for bleaching and stripping of textiles, pulp and paper; for disinfecting wash water for fruits, vegetables, poultry; used in mouthwashes, toothpastes, eye drops	Yes	NL	No	No	NA	NA	3,018	0.02942
70	Sodium thiosulfate	007772-98-7	Stabilizer	Reduces thermal degradation	Used to lower chlorine and bromine levels; used as components in hand warmers; as antidote to cyanide poisoning; used in medical treatments	Yes	F, NF	No	No	NL	NL	1,086	0.15843
71	Sodium Persulfate	007775-27-1	Breaker	Allows a delayed break down of the gel	Oxidizer used in hair colorants and lighteners; also in detergents and as a soil conditioner	Yes	NF	No	No	NA	NA	2,187	0.00507
72	Diammonium phosphate	007783-28-0	Anti-corrosion	Buffering agent	Used in caramel food coloring, dough strengtheners, buffering agent in toothpaste	Yes	F, NF	No	No	NL	NL	150	0.00103
73	Magnesium chloride hexahydrate	007791-18-6	Gelling Agent		Used in pharmaceuticals, food supplements; wastewater treatment facilities	No	NL	No	No	NL	NL	29	0.00343
74	Guar Gum	009000-30-0	Gelling Agent	Thickens the water in order to suspend the sand	Used as a thickener and stabilizer in foods, toothpaste, shampoo; also as a clumping agent in kitty litter	Yes	F, NF	No	No	NL	NL	9,611	0.22698
75	Polyacrylamide	009003-05-8	Friction Reducer	"Slacks" the water to minimize friction	Used as a flocculent in water treatment facilities; as a soil conditioner; used in skin care products and manufacture of soft contact lenses	Yes	F, NF	No	No	NL	NL	45	0.01076
76	Phenol/formaldehyde resin	009003-35-4	Proppant	Acts to keep fractures propped open	Used in manufacture of laminates, billiard balls, unsulation, countertops, and adhesives.	Yes	NF	No	No	NL	NL	3,409	0.21152
77	Sodium carboxymethyl cellulose	009004-32-4	Gelling Agent	Acts as a thickener	Used as a food additive (E466); also used in toothpaste, laxatives, diet pills, artificial tears, ice packs; paints, detergents, solid air fresheners	Yes	F, NF	No	No	NL	NL	1,140	0.00293
78	Sorbitan monooleate polyoxyethylene derivative	009005-65-6	Thickener	Acts as a thickener	Polysorbate 80 - emulsifier in foods; also used as a surfactant in soap, toothpaste and shampoo	Yes	F, NF	No	No	NL	NL	2,893	0.00044
79	Cellulase	009012-54-8	Breaker	General term for enzymes which assist with the decomposition of cellulose and polysaccharides	Used in laundry detergents, septic system treatments; also used in processing of coffee	Yes	NF	No	No	NL	NL	278	0.00259
80	Poly (oxy-1,2-ethanediyl), a-(nonylphenyl)-w-hydroxy-	009016-45-9	Surfactant	Product stabilizer	Used in hair coloring products; cleansers and degreasers	Yes	F, NF, Fr	No	No	NL	NL	3,084	0.01559
81	Isotridecyl alcohol ethoxylates	009043-30-5	Surfactant		Dishwashing detergent, rinse aid, shoe polish, stain remover	Yes	F, NF	No	No	NL	NL	2,140	0.00976
82	Polyol polyether	009082-00-2	Surfactant	Surfactant	Hair gel, cosmetics	Yes	NF	No	No	NL	NL	33	NR
83	Boric Acid	010043-35-3	Crosslinker	Maintains fluid viscosity as temperature increases	Occurs naturally in seawater, many plants and most fruit; used as a cleaning agent, antiseptic, and preservative	Yes	F, NF	No	No	NL	NL	1,343	0.01442
84	2,2-Dibromo-3-Nitropropionamide	010222-01-2	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Used as a biocide in water cooling facilities; quickly biodegrades in water	Yes	NL	No	No	NL	NL	3,344	0.00418

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85	Sodium perborate tetrahydrate	010486-00-7	Viscosity Reducer	Reduces fluid viscosity	Used as a less aggressive bleach in some all-purpose and fabric cleaners	No	NF	No	No	NL	NL	1,472	0.01244
86	Xanthum gum	011138-66-2	Thickener	Acts as a thickener	Used as a thickener and stabilizer in food and cosmetic products; food additive (E415)	Yes	F, NF	No	No	NL	NL	1,034	0.00843
87	Disodium Octaborate Tetrahydrate	012008-41-2	Crosslinker	Maintains fluid viscosity as temperature increases	Used as an insecticide against termites and carpenter ants; also as a flame retardant	Yes	NL	No	No	NL	NL	20	0.04942
88	Ammonium chloride	012125-02-9	Clay Stabilizer	Prevents clays from swelling or shifting	Used primarily as nitrogen source in fertilizers; also as expectorant in cough medicine; shampoos; food additive (E510);	Yes	F, NF	No	No	NA	NA	5,434	0.00554
89	Laryl dimethyl hydroxysulfonate	013197-76-7	Surfactant		Shampoo, body soap	Yes	NL	No	No	NL	NL	29	0.08355
90	Potassium Metaborate	013709-94-9	Crosslinker	Maintains fluid viscosity as temperature increases	Derived from boric acid; used in fertilizers and cleansers	Yes	NL	No	No	NL	NL	1,933	0.01973
91	Magnesium Peroxide	014452-57-4	Breaker	Allows a delayed break down of the gel	Used in bioremediation of cotnaminated soils; also as soil amendment	Yes	NL	No	No	NL	NL	253	0.00228
92	Crystalline silica, quartz	014808-60-7	Proppant	Acts to keep fractures propped open	Used as abrasive in cleaners; used in paints, caulk, wood filler and putty	Yes	F, NF	Yes, Group 1 (inhalation)	Yes, inhalation	NA	NA	35,465	5.13010
93	1-(Benzyl) quinolinium chloride	015619-48-4	Corrosion Inhibitor	Prevents the corrosion of the pipe		Yes	NL	No	No	NL	NL	997	0.00051
94	Dipropylene glycol	025265-71-8	Crosslinker	Polymer initiator	Often used as an additive to perfumes and skin and hair products; ingredient in fog fluid for smoke machines	Yes	F, NF, Fr	No	No	NL	NL	3	0.00359
95	Copolymer of Acrylamide and Sodium Acrylate	025987-30-8	Scale Inhibitor	Prevents scale deposits in the pipe		Yes	NL	No	No	NL	NL	1,328	0.01888
96	Orthoboric acid ethanolamine salt	026038-87-9	Crosslinker			Yes	NF	No	No	NL	NL	818	0.06435
97	Sorbitan, monododecanoate, poly (oxy-1,2-ethanedijl_ dervis	026266-58-0	Emulsifier	Corrosion inhibitor and buffering agent	Cosmetics	Yes	F, NF	No	No	NL	NL	77	0.00651
98	Dodecylbenzene sulfonic acid	027176-87-0	Surfactant	Product stabilizer	Used in car wash liquids and liquid laundry detergents; biodegradable	Yes	F, NF	No	No	NL	NL	1,122	0.00098
99	Formaldehyde polymer with 4,1,1 dimethylethyl phenolmethyl oxirane	029316-47-0	Corrosion Inhibitor	Corrosion Inhibitor		Yes	NL	No	No	NL	NL	379	0.01097
100	Antimony potassium oxide	029638-69-5	Crosslinker		Used as a pigment in some paints	Yes	NL	No	No	NL	NL	94	0.00236
101	Poly (oxy-1,2-ethanedijl), alpha-hexyl-omega-hydroxy(C2H4O)N(C6H14)	031726-34-8	Friction Reducer		Used in some cleaners; also in some brake fluids	Yes	F, NF	No	No	NL	NL	1,366	0.00733
102	Dipropylene glycol methyl ether	034590-94-8	Corrosion Inhibitor	Ehances solubility of surfactants in water and oil	Used as a solvent in cleaning products; as enhancer in soaps and shampoo; oil dispersant	Yes	F, NF, Fr	No	No	100	100	396	0.02807
103	Tetrakis Hydroxymethyl-Phosphonium Sulfate	055566-30-8	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Used as a anti-microbial and preservative in pigments, coatings, and fire protection systems	Yes	NL	No	No	NL	NL	2,246	0.01432
104	Polymethylene polyphenol isocyanate	057029-46-6			Aerosol foam sealant and tile adhesive	Yes	NL	No	No	NL	NL	232	0.17176
105	Quaternary Ammonium Chloride	061789-71-7	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Used in common household cleaners and degreasers	Yes	NL	No	No	NL	NL	76	0.00294
106	Polyethoxylated fatty amine salt	061791-26-2	Surfactant	Product stabilizer	Used in toilet bowl cleaner, weed killer	Yes	F, NF	No	No	NL	NL	1,019	0.00049
107	Formaldehyde polymer with methyl oxirane, 4-nonylphenol and oxirane	063428-92-2	Corrosion Inhibitor, Friction Reducer, Bactericide, Surfactant	Limits corrosion and bacteria in the pipe and lubricates fluid		Yes	NL	No	No	NL	NL	606	0.01919
108	Petroleum Distillate	064741-85-1	Crosslinker, Frction Reducer, Gelling Agent	Carrier fluid for borate or zirconate crosslinker	Also called mineral spirits; used in paint, paint removers;	Yes	NL	No	No	NL	NL	343	0.08663
109	Hydrotreated Light Petroleum Distillate	064742-47-8	Crosslinker, Friction Reducer, Gelling Agent	Carrier fluid for borate or zirconate crosslinker	Used in wide variety of auto care products; in stains and paints; as a carrier fluid for numerous pesticides,	Yes	F, NF, Fr	No	No	NL	NL	16,320	0.15692
110	Heavy aromatic petroleum naptha	064742-94-5	Surfactant	Product stabilizer	Used in wide variety of auto care products; in stains and paints; as a carrier fluid for numerous pesticides,	Yes	F, NF	No	No	NL	NL	3,914	0.01360
111	Alcohols, C10-16, ethoxylated	068002-97-1	Surfactant, Corrosion Inhibitor, Friction Reducer, Demulsifier,		Perfume fixative for soaps and cosmetics., used in specially cleaning products, as an anti-foam agent and in some plastics. It is also used as a food additive	Yes	F, NF	No	No	NL	NL	19,375	0.02142
112	Napthenic acid ethoxylate	068410-62-8				Yes	NL	No	No	NL	NL	1,115	0.00143
113	Quaternary ammonium compounds, benzyl-C12-16-C16 alkylidimethyl, chlorides	068424-85-1	Biocide	Eliminates bacteria in the water that produces corrosive by-products	Used in a wide variety of household disinfectants	Yes	F, NF	No	No	NL	NI	23,399	0.03257
114	Ethoxylated hexanol	068439-45-2			Used in kitchen cleaners	Yes	F, NF	No				213	0.02474
115	Alcohols, C9-11, ethoxylated	068439-46-3	Surfactant, non-emulsifier, friction reducer	Breaks up oil from water and limits clogging of formation pore spaces during stimulation	raw material for detergents and as an anti-foam agent. It is used in synthetic lubricants and the production of flexible plastics.	Yes	F, NF, Fr	No	No	NL	NL	4,941	0.00841
116	Thiourea Polymer (modified)	068527-49-1	Corrosion Inhibitor	Prevents the corrosion of the pipe		Yes	NL	No	No	NL	NL	4,406	0.00100

Nevada Division of Minerals Hydraulic Fracture Chemical Disclosure Reference List
(in CASRN™ numerical order)

Row #	Chemical Name (* indicates Trade Name or ingredient is Trade Secret)	Chemical Abstracts Service Registry Number (CASRN™) (1)	Product Function	Chemical Purpose	Other Uses (2)	Existing Chemical on EPA TSCA list (3)	EPA's Pesticide InertFinder Listing If Approved for Food, NonFood, Fragrance Use (4)	Carcinogenic Agent Classified (Group 1 or 2) by the IARC Monographs - (V. 1-109) (5)	CA Prop.65 Listed Agent (6)	NIOSH REL (TWA ppm) (7)	OSHA PEL (TWA ppm) (7)	API Well Usage Count West of Long. 104 (8)	Avg. Conc. In HF Fluid (% by mass) (8)
117	Alcohols, C12-16, ethoxylated	068551-12-2	Friction Reducer		Used in a wide variety of household cleaners, detergents, and stain removers	Yes	F, NF	No	No	NL	NL	4,671	0.00219
118	Terpenes and terpenoids, sweet orange-oil	068647-72-3	Fluid Mobility Modifier	Minimize surface tension	Hand cleaner, lotions, furniture dusting spray	Yes	Fr	No	No	NL	NL	936	0.01190
119	Alcohols, C14-C15, ethoxylated	068951-67-7	Surfactant/Emulsifier		Used in a variety of laundry detergents and stain removers	Yes	F, NF	No	No	NL	NL	12,877	0.00565
120	Quaternary Ammonium Compounds, Bis(hydrogenated Tallow Alkyl)dimethyl, Salt with Bentonite	068953-58-2	Adjusts Viscosity	Adjusts Viscosity		Yes	NL	No	No	NL	NL	1,707	0.00960
121	2,2-Dibromomalonamide	073003-80-2	Biocide			Yes	NL	No	No	NL	NL	274	0.00017
122	Ethoxylated branched C13 alcohol	078330-21-9	Friction Reducer		Used in a variety of hair, hand and body washes, kitchen cleaners and degreasers	Yes	F, NF, Fr	No	No	NL	NL	14,871	0.00311
123	Citrus, extract	094266-47-4	Fluid Mobility Modifier	Minimize surface tension	Perfumes, cleaners, and adhesive removers	No	NF, Fr	No	No	NL	NL	1,183	0.03507
124	Triethanolamine Zirconate	101033-44-7	Crosslinker	Maintains fluid viscosity as temperature increases	Used as a catalyst for resin crosslinking and surface treatment on pigments	Yes	NL	No	No	NL	NL	306	0.02449
125	Silica gel	112926-00-8	Dessicant		Used as a dessicant in small containers to control local humidity and avoid spoilage or degradation of some foods, vitamins, and prescriptions; also used as an anti-caking agent in some powdered food products; as an abrasive in toothpastes and skin cleansers; used in paints	Yes	F, NF	No	No	NA	NA	2,053	0.00176
126	Zirconium Complex	113184-20-6	Crosslinker	Maintains fluid viscosity as temperature increases		Yes	NL	No	No	NL	NL	63	0.00686
127	Bentonite, benzyl(hydrogenated tallow alkyl) dimethylammonium stearate complex	121888-68-4	Water treatment	Used to separate hydrocarbons from water	Used in water filtration facilities; also at sediment and soil remediation sites	No	NF	No	No	NL	NL	1,938	0.00930
128	Poly(oxy-1,2-ethanedyl), alpha-(4-nonylphenyl)-omega-hydroxy-, branched	127087-87-0	Surfactant	Product stabilizer	Used as a degreaser and cleaner,; also in wood finishes	Yes	F, NF	No	No	NL	NL	2,733	0.00300
129	Reaction product of acetophenone, formaldehyde, cyclohexylamine, methanol and acetic acid	224635-63-6	Corrosion Inhibitor	Multiple drilling purposes		No	NL	No	No	NL	NL	1,596	0.00046
130	*Acrylate polymer	*TS			Used in soaps, hair products, lip gloss; also used in spackle and caulking	Yes	NF	No	No	NL	NL	588	0.00105
131	*Aldehyde	*TS				Yes	NF	No	No	NL	NL	1,222	0.00147
132	*Alkyl sulfonate	*TS			Used in some household cleaning products	Yes	NF	No	No	NL	NL	62	0.10193
133	*Amide	*TS			Used in some exterior car care products	Yes	NF	No	No	NL	NL	87	0.00123
134	*Amine salts	*TS					F, NF	No	No	NL	NL	3,208	0.00017
135	*Borate Salts	*TS	Crosslinker	Maintains fluid viscosity as temperature increases	Used in some laundry detergents; also as a water conditioner	No	NF	No	No	NL	NL	1,711	0.04858
136	*EDTA/Copper chelate	*TS	Activator			No	NF	No	No	NL	NL	755	0.00691
137	*Ethoxylated amine	*TS			Used in detergents and in some marine epoxies and paints	Yes	F, NF	No	No	NL	NL	968	0.00053
138	*Fatty acid tall oil amide	*TS				Yes	NF	No	No	NL	NL	1,899	0.00189
139	*Fatty acids, tall oil	*TS	Corrosion inhibitor, lubricant, surfactant		Used in a variety of cleaners and polishes	Yes	F, NF	No	No	NL	NL	1,777	0.00147
140	*Guar gum derivative	*TS	Gelling agent	Thickens the water in order to suspend the sand	Used as a thickener in shampoos, body washes, and soaps	No	F, NF	No	No	NL	NL	548	0.37695
141	*Modified alkane (e.g. CL-22UCw™)	*TS	Crosslinker	Maintains fluid viscosity as temperature increases		Yes	NL	Yes, 1 constituent at 0.1% of total product mass	Yes, 2 constituents each at 0.1% of total product mass	NA	5 mg/m³	305	0.05856
142	*Oxyalkylated phenolic resin	*TS				Yes	NF	No	No	NL	NL	4,080	0.01158
143	*Oxylated alcohol	*TS	Surfactant			Yes	F, NF	No	No	NL	NL	10	0.00267
144	*Phosphonic Acid Salt	*TS	Scale Inhibitor	Prevents scale deposits in the pipe		No	F, NF	No	No	NL	NL	308	0.00465
145	*Polyacrylamide copolymer (e.g. FightR EC-1™)	*TS	Friction Reducer		Used in hair conditioners and skin moisturizers	Yes	NF	No	No	NL	NL	2394	0.01137
146	*Polysaccharide (e.g. DCA-25005™)	*TS	Gelling Agent	Thickens the water in order to suspend the sand	Used in glue, absorbent powders, and anti-perspirant	Yes	NF	No	No	NL	NL	58	0.20468
147	*Quaternary amine	*TS				No	NL	No	No	NI	NL	5,074	0.00103
148	*Quaternary ammonium salt (e.g. Cla-Web™)	*TS	Corrosion Inhibitor			Yes	NF	No	No	NL	NL	1,262	0.00105
149	*Sodium polycarboxylate	*TS	Scale Inhibitor	Prevents scale deposits in the pipe		Yes	NF	No	No	NL	NL	204	0.00079
150	*Surfactant mixture	*TS	Surfactant			Yes	NF	No	No	NL	NL	3,844	0.00188

Sources:

(1) Chemical Abstracts Service Registry Number is a Registered Trademark of the American Chemical Society - <http://www.cas.org>

(2) US Dept. of Health and Human Services' Household Products Database - <https://pubchem.ncbi.nlm.nih.gov/> , EPA ChemView - <https://chemview.epa.gov/chemview>

(3) EPA Toxic Substances Control Act listing (Feb. 2021) for production, importation, use and disposal of specific chemicals (excludes food, drugs, cosmetics, and pesticides) - https://enviro.epa.gov/facts/tsca/tsca_search.html; DOWNLOAD new list @ <https://>

Nevada Division of Minerals Hydraulic Fracture Chemical Disclosure Reference List
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	(4) EPA Pesticide InertFinder database listing of inert substances in pesticides for Food, Nonfood, and Fragrance uses - http://iaspub.epa.gov/apex/pesticides/f?p=INERTFINDER:1:0::NO:1::												
	(5) World Health Association's International Agency for Research on Cancer Monographs on the Evaluation of Carcinogenic Risks to Humans Volumes 1-23 (2/12/2019) - http://monographs.iarc.fr/ (Page: https://monographs.iarc.who.int/list-of-classifications)												
	(6) California Office of Environmental Health Hazard Assessment Proposition 65 List of Chemicals Known to Cause Cancer or Reproductive Toxicity (12/18/2020) - https://oehha.ca.gov/proposition-65/proposition-65-list/												
	(7) OSHA Occupational Chemical Database - https://www.osha.gov/chemicaldata/ ; and NIOSH Pocket Guide to Chemical Hazards - http://www.cdc.gov/niosh/npg/npgdcas.html												
	(8) FracFocus Chemical Disclosure Registry dataset (version 3.0) as of 3/1/2019; subset utilizing information from 28,088 registered wells located west of Longitude 104 degrees, i.e. western states - http://www.fracfocus.org/												